FIG.1

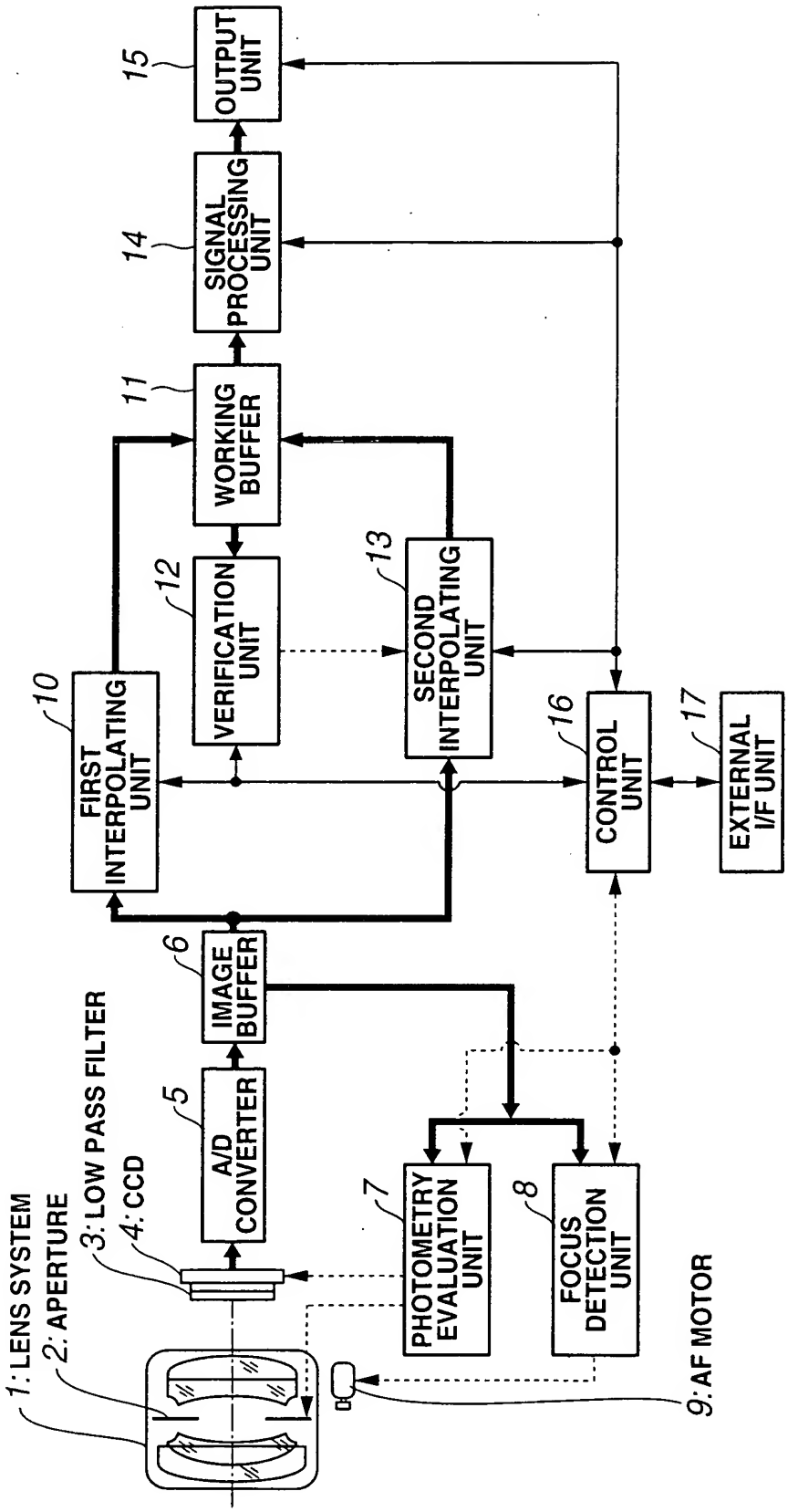


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
1: LENS SYSTEM
2: APERTURE
3: LOW PASS FILTER
4: CCD
5
A/D CONVERTER
6
IMAGE BUFFER
7
PHOTOMETRY EVALUATION UNIT
8
FOCUS DETECTION UNIT
9: AF MOTOR
10
FIRST INTERPOLATING UNIT
11
WORKING BUFFER
12
VERIFICATION UNIT
13
SECOND INTERPOLATING UNIT
14
SIGNAL PROCESSING UNIT
15
OUTPUT UNIT
16
CONTROL UNIT
17
EXTERNAL I/F UNIT

FIG.2

(A)

(B)

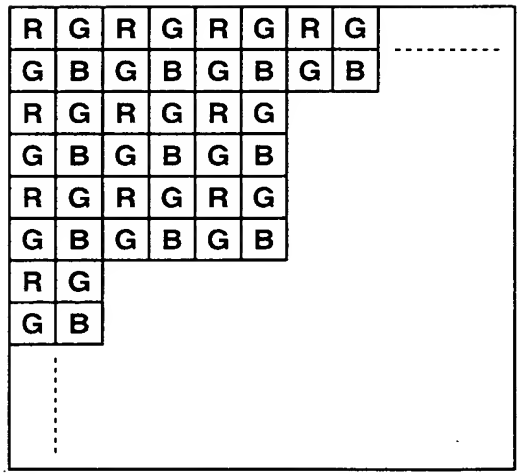


FIG.3

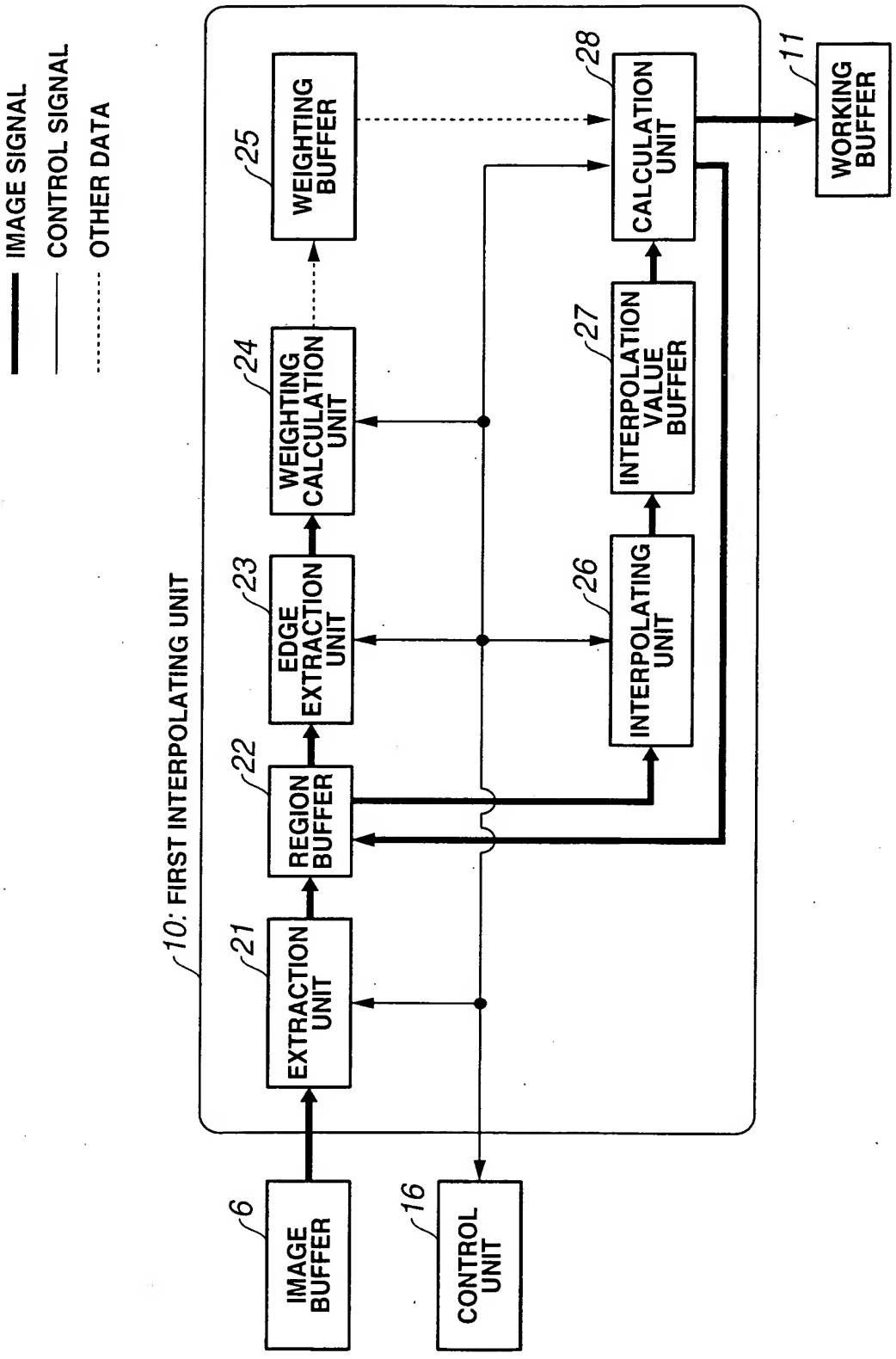


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
10: FIRST INTERPOLATING UNIT
6
IMAGE BUFFER
16
CONTROL UNIT
21
EXTRACTION UNIT
22
REGION BUFFER
23
EDGE EXTRACTION UNIT
24
WEIGHTING CALCULATION UNIT
25
WEIGHTING BUFFER
26
INTERPOLATING UNIT
27
INTERPOLATION VALUE BUFFER
28
CALCULATION UNIT
11
WORKING BUFFER

FIG.4

(A) PIXEL LAYOUT OF EXTRACTED BLOCK

R00	G10	R20	G30	R40	G50
G01	B11	G21	B31	G41	B51
R02	G12	R22	G32	R42	G52
G03	B13	G23	B33	G43	B53
R04	G14	R24	G34	R44	G54
G05	B15	G25	B35	G45	B55

(B) G INTERPOLATION (R22 POSITION)

		R20		
		G21		
R02	G12	R22	G32	R42
		G23		
		R24		

(C) G INTERPOLATION (B33 VALUE)

		B31		
		G32		
B13	G23	B33	G43	B53
		G34		
		B35		

(D) R,B INTERPOLATION (G23 VALUE)

	B11 G11		B31 G31	
R02 G02		R22 G22		R42 G42
	B13 G13	G23	B33 G33	
R04 G04		R24 G24		R44 G44
	B15 G15		B35 G35	

(E) R,B INTERPOLATION (G32 VALUE)

	R20 G20		R40 G40	
B11 G11		B31 G31		B51 G51
	R22 G22	G32	R42 G42	
B13 G13		B33 G33		B53 G53
	R24 G24		R44 G44	

(F) R,B INTERPOLATION (R22 POSITION)

B11 G11		B31 G31
	R22 G22	
B13 G13		B33 G33

(G) R,B INTERPOLATION (B33 POSITION)

R22 G22		R42 G42
	B33 G33	
R24 G24		R44 G44

FIG.5

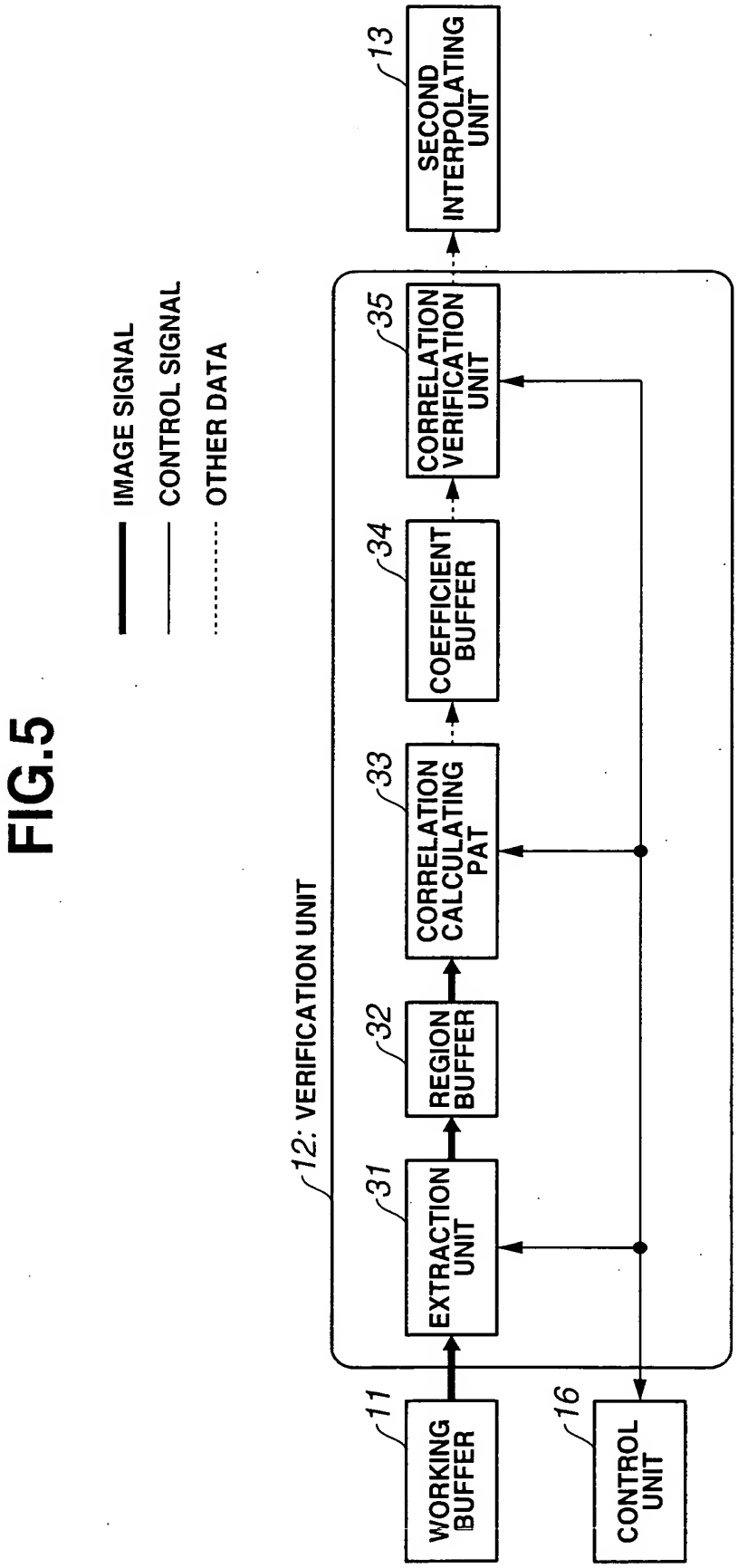
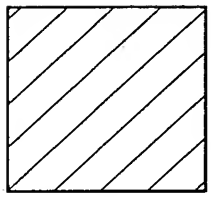
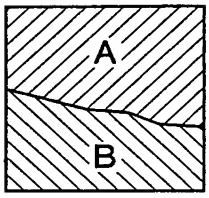


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
12: VERIFICATION UNIT
11
WORKING BUFFER
31
EXTRACTION UNIT
32
REGION BUFFER
33
CORRELATION CALCULATING PAT
34
COEFFICIENT BUFFER
35
CORRELATION VERIFICATION UNIT
13
SECOND INTERPOLATING UNIT
16
CONTROL UNIT

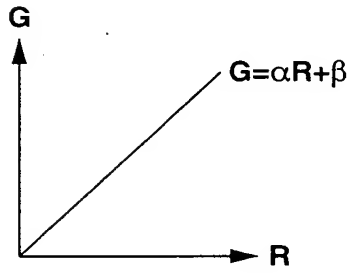
FIG.6



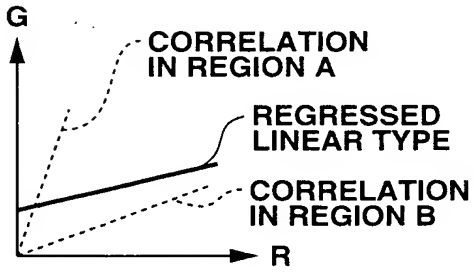
(A) SINGLE HUE INPUT IMAGE



(C) MULTI-HUE INPUT IMAGE



(B) REGRESSION TO SINGLE HUE LINEAR TYPE



(D) REGRESSION TO MULTI-HUE LINEAR TYPE

FIG.7

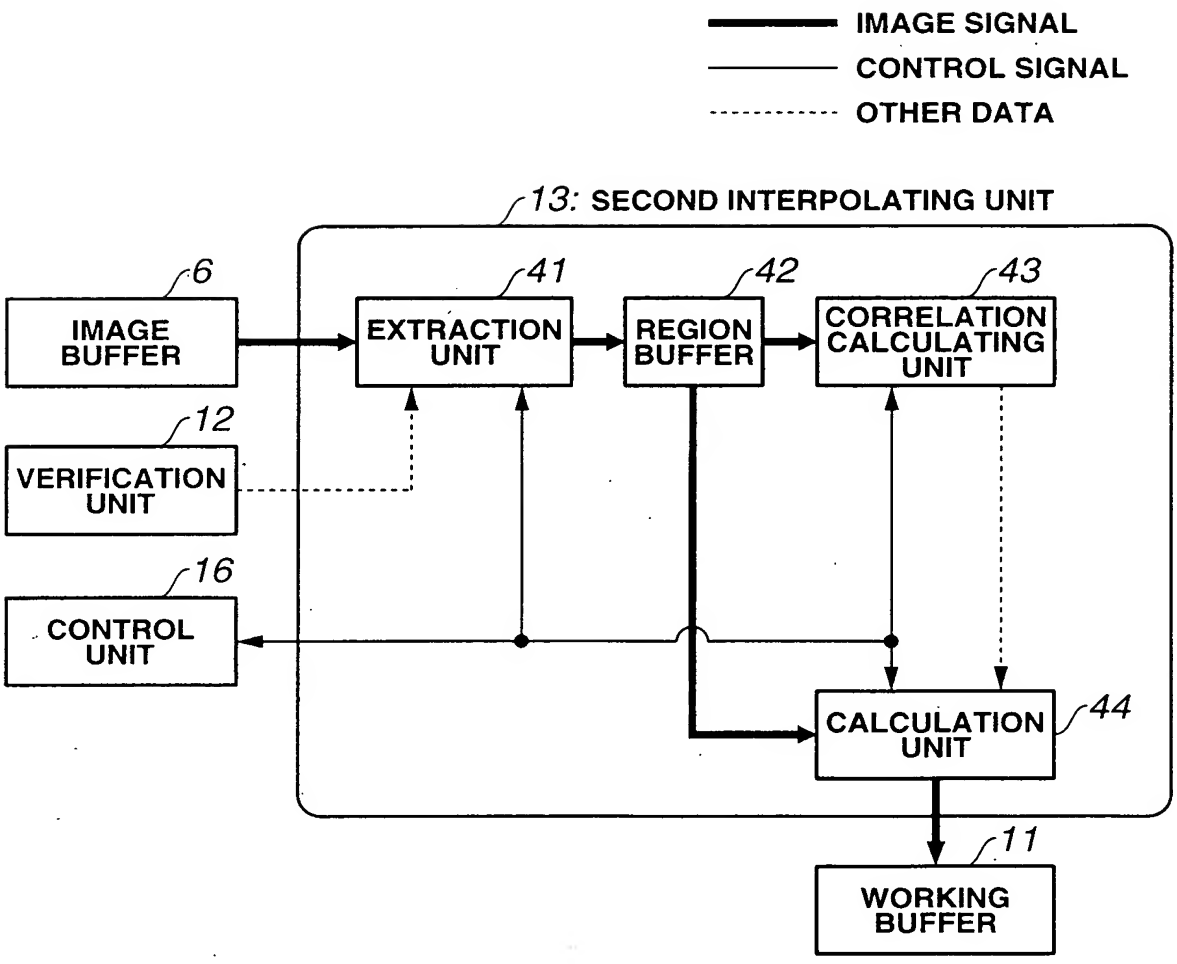


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
13: SECOND INTERPOLATING UNIT
6
IMAGE BUFFER
41
EXTRACTION UNIT
42
REGION BUFFER
43
CORRELATION CALCULATING UNIT
12
VERIFICATION UNIT
16
CONTROL UNIT
CALCULATION UNIT
44
11
WORKING BUFFER

FIG.8

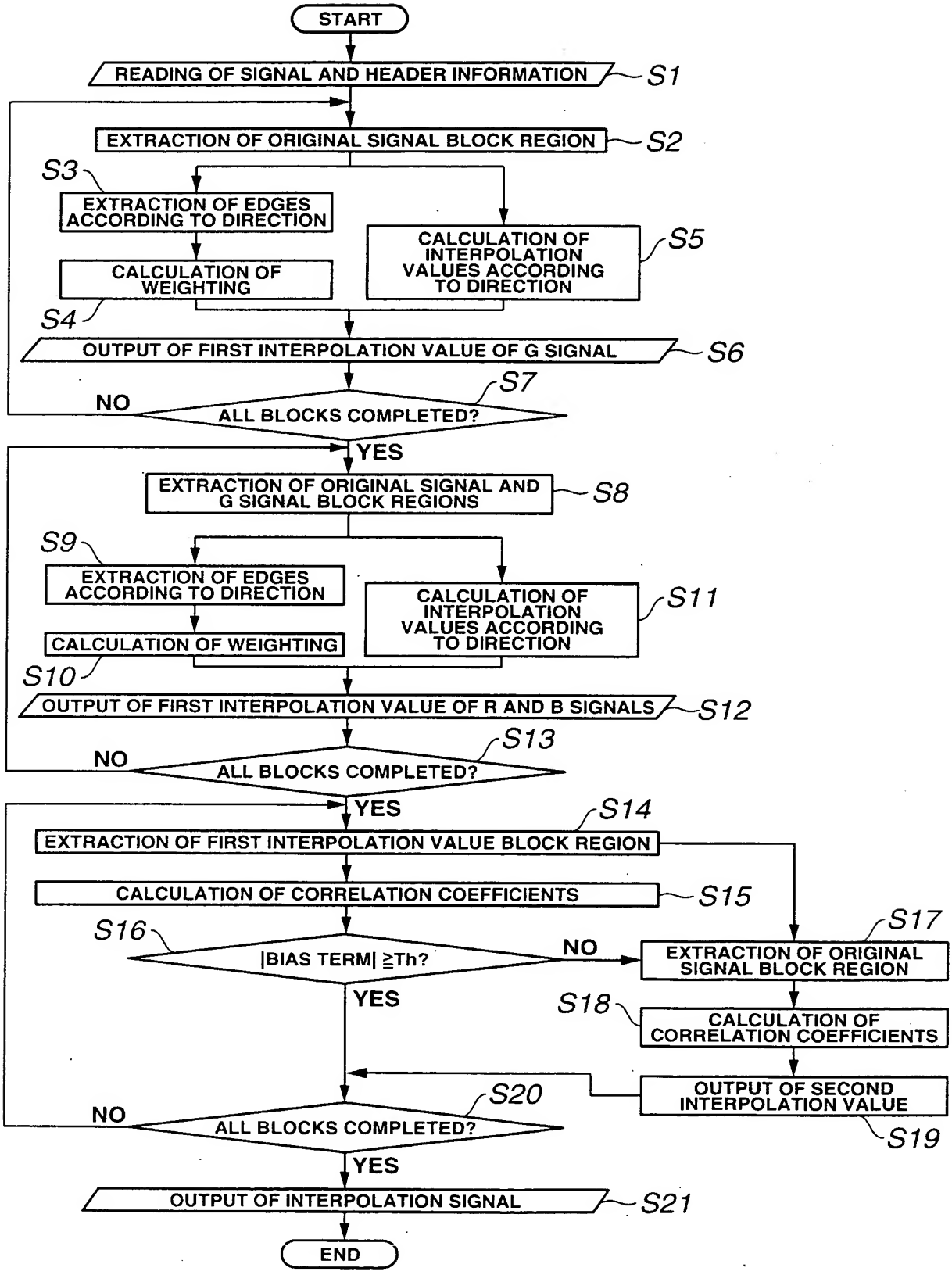

START
READING OF SIGNAL AND HEADER INFORMATION
S1
EXTRACTION OF ORIGINAL SIGNAL BLOCK REGION
S2
S3
EXTRACTION OF EDGES ACCORDING TO DIRECTION
CALCULATION OF WEIGHTING
S4
CALCULATION OF INTERPOLATION VALUES ACCORDING TO DIRECTION
S5
OUTPUT OF FIRST INTERPOLATION VALUE OF G SIGNAL
S6
S7
NO
ALL BLOCKS COMPLETED?
YES
EXTRACTION OF ORIGINAL SIGNAL AND G SIGNAL BLOCK REGIONS
S8
S9
EXTRACTION OF EDGES ACCORDING TO DIRECTION
CALCULATION OF WEIGHTING
S10
CALCULATION OF INTERPOLATION VALUES ACCORDING TO DIRECTION
S11
OUTPUT OF FIRST INTERPOLATION VALUE OF R AND B SIGNALS
S12
S13
NO
ALL BLOCKS COMPLETED?
YES
S14
EXTRACTION OF FIRST INTERPOLATION VALUE BLOCK REGION
CALCULATION OF CORRELATION COEFFICIENTS
S15
S16
|BIAS TERM| ≧Th?
NO
YES
S17
EXTRACTION OF ORIGINAL SIGNAL BLOCK REGION
S18
CALCULATION OF CORRELATION COEFFICIENTS
OUTPUT OF SECOND INTERPOLATION VALUE
S19
S20
NO
ALL BLOCKS COMPLETED?
YES
OUTPUT OF INTERPOLATION SIGNAL
S21
END

FIG.9

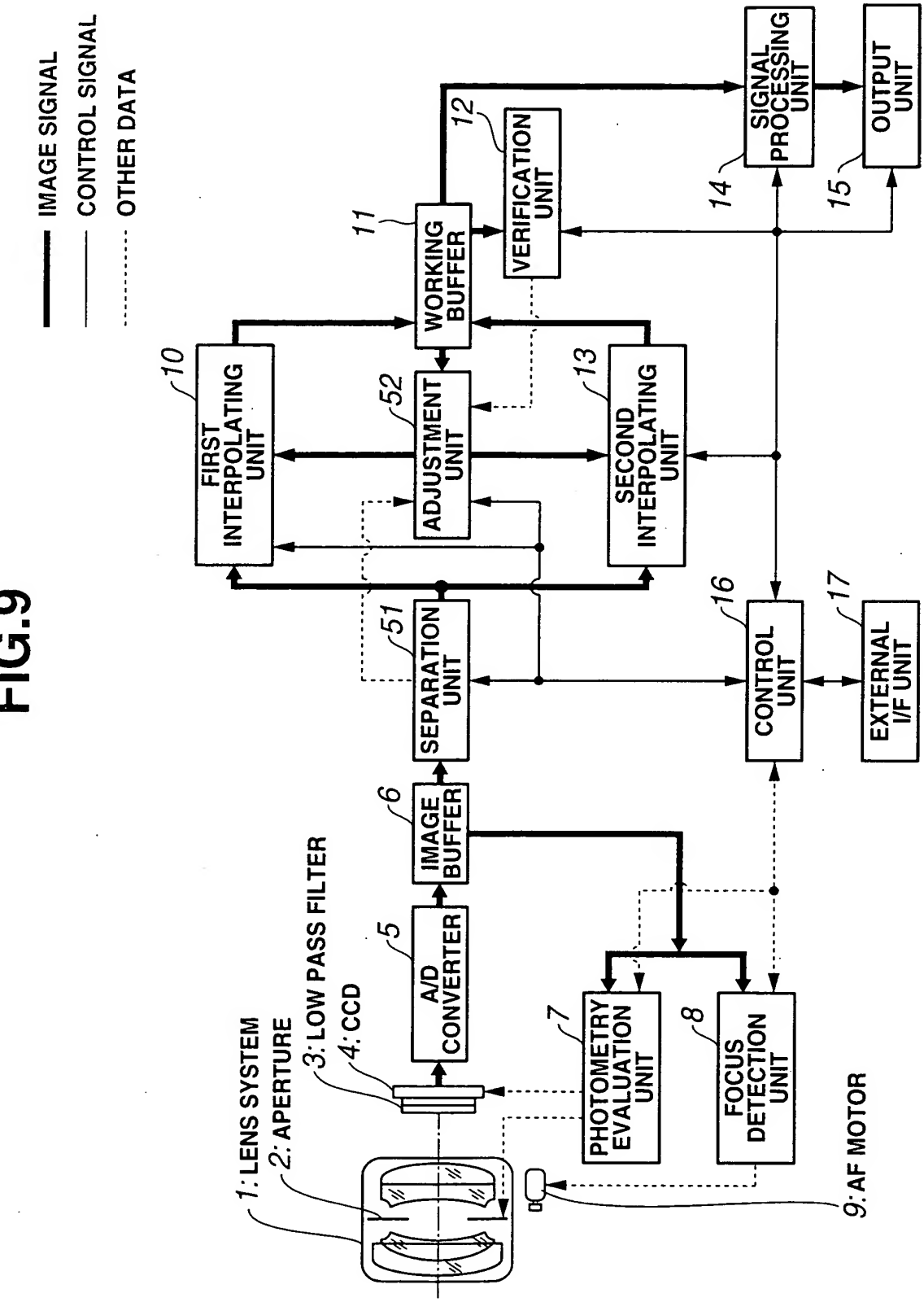


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
1: LENS SYSTEM
2: APERTURE
3: LOW PASS FILTER
4: CCD
5
A/D CONVERTER
6
IMAGE BUFFER
51
SEPARATION UNIT
10
FIRST INTERPOLATING UNIT
52
ADJUSTMENT UNIT
13
SECOND INTERPOLATING UNIT
11
WORKING BUFFER
12
VERIFICATION UNIT
7
PHOTOMETRY EVALUATION UNIT
8
FOCUS DETECTION UNIT
9: AF MOTOR
16
CONTROL UNIT
17
EXTERNAL I/F UNIT
14
SIGNAL PROCESSING UNIT
15
OUTPUT UNIT

FIG.10

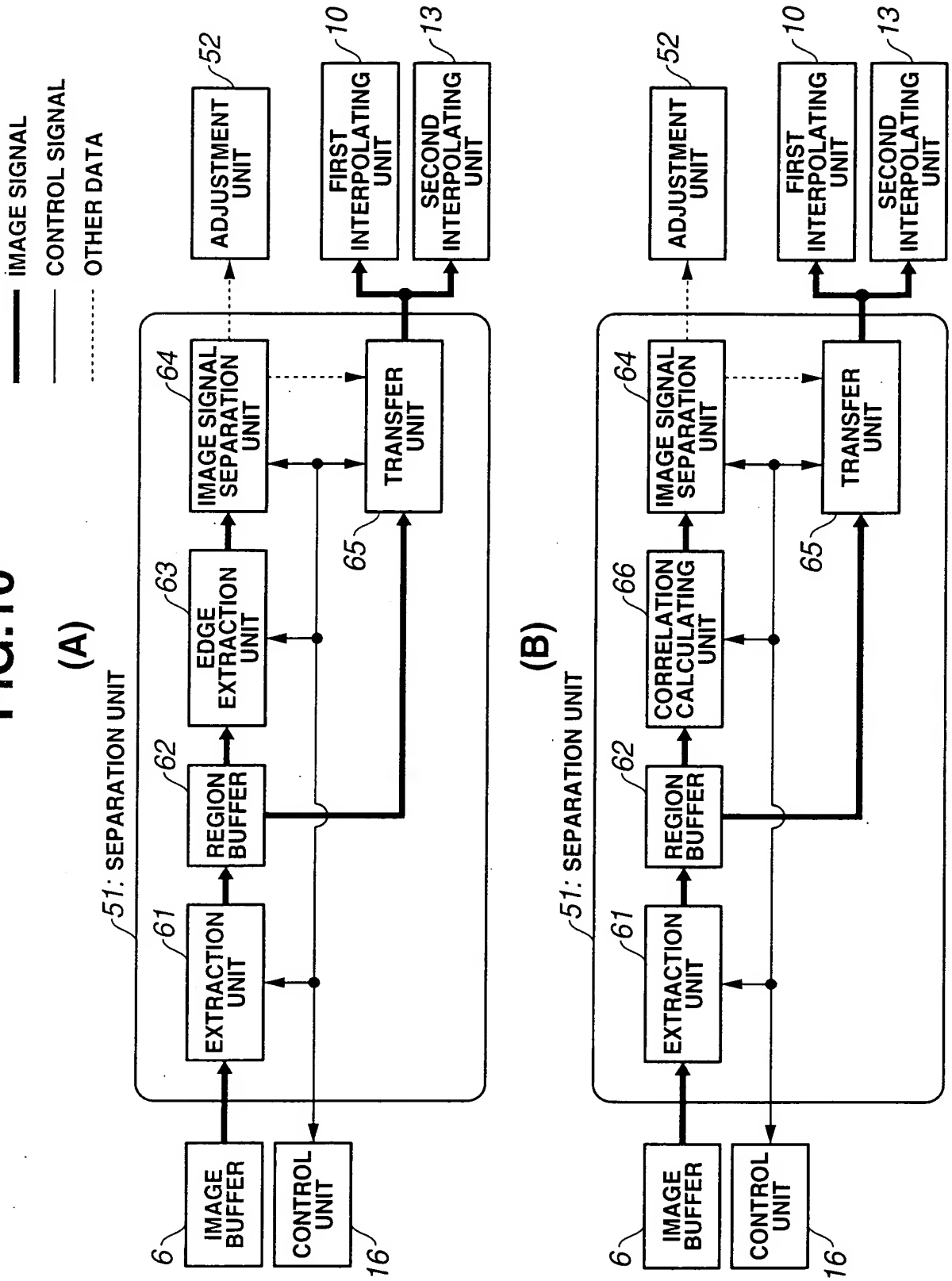


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
(A)
51: SEPARATION UNIT
IMAGE BUFFER
6
CONTROL UNIT
16
EXTRACTION UNIT
61
REGION BUFFER
62
EDGE EXTRACTION UNIT
63
IMAGE SIGNAL SEPARATION UNIT
64
TRANSFER UNIT
65
ADJUSTMENT UNIT
52
FIRST INTERPOLATING UNIT
10
SECOND INTERPOLATING UNIT
13
(B)
51: SEPARATION UNIT
IMAGE BUFFER
6
CONTROL UNIT
16
EXTRACTION UNIT
61
REGION BUFFER
62
CORRELATION CALCULATING UNIT
66
IMAGE SIGNAL SEPARATION UNIT
64
TRANSFER UNIT
65
ADJUSTMENT UNIT
52
FIRST INTERPOLATING UNIT
10
SECOND INTERPOLATING UNIT
13

FIG.11

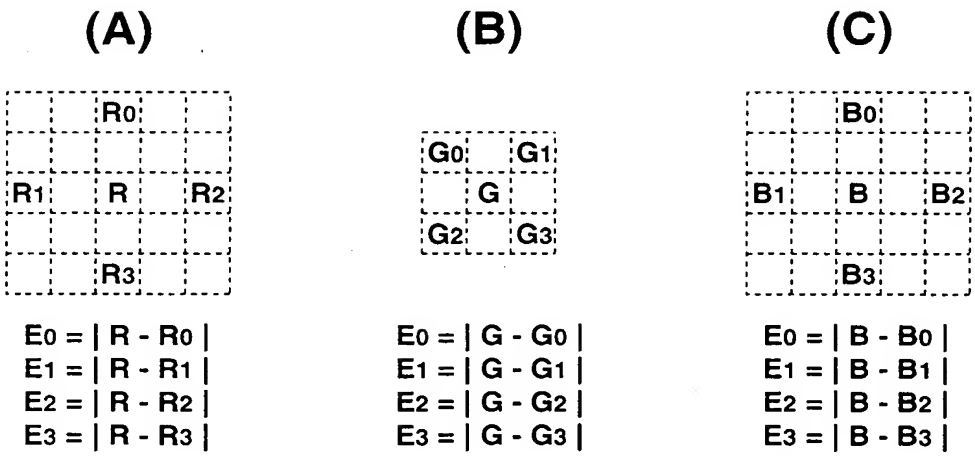

(A)
R0
R1
R
R2
R3
E0 = | R - R0 |
E1 = | R - R1 |
E2 = | R - R2 |
E3 = | R - R3 |
(B)
G0
G1
G
G2
G3
E0 = | G - G0 |
E1 = | G - G1 |
E2 = | G - G2 |
E3 = | G - G3 |
(C)
B0
B1
B
B2
B3
E0 = | B - B0 |
E1 = | B - B1 |
E2 = | B - B2 |
E3 = | B - B3 |

FIG.12

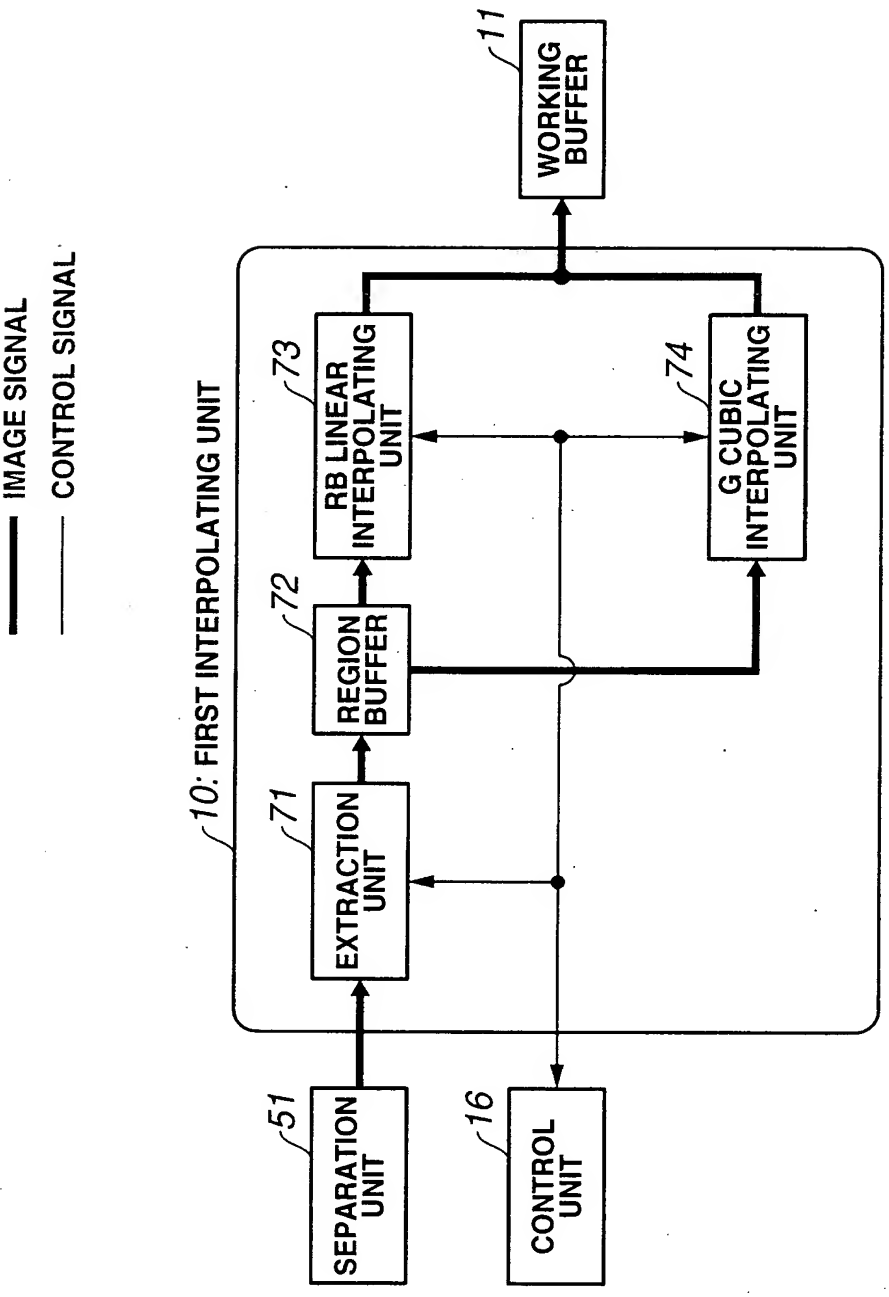


IMAGE SIGNAL
CONTROL SIGNAL
10: FIRST INTERPOLATING UNIT
51
SEPARATION UNIT
71
EXTRACTION UNIT
72
REGION BUFFER
73
RB LINEAR INTERPOLATING UNIT
74
G CUBIC INTERPOLATING UNIT
11
WORKING BUFFER
16
CONTROL UNIT

FIG.13

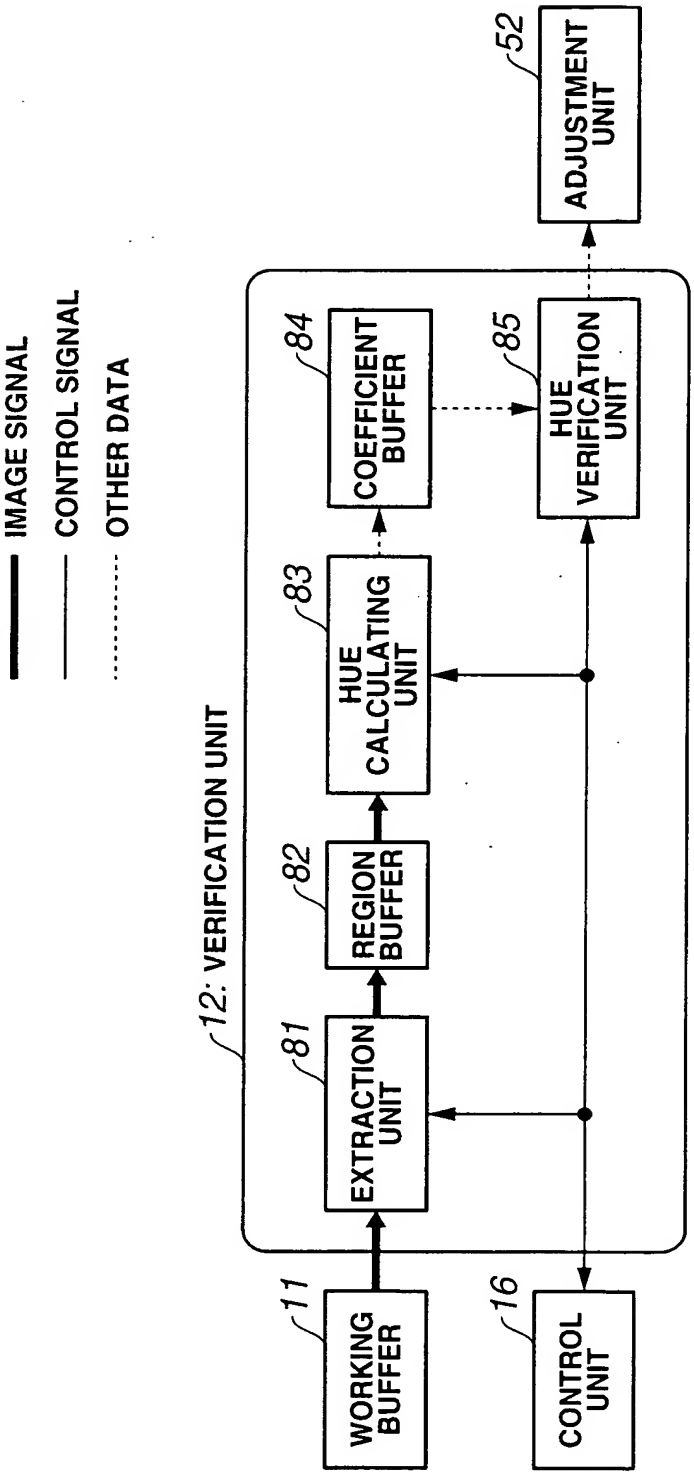


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
12: VERIFICATION UNIT
WORKING BUFFER
11
EXTRACTION UNIT
81
REGION BUFFER
82
HUE CALCULATING UNIT
83
COEFFICIENT BUFFER
84
HUE VERIFICATION UNIT
85
ADJUSTMENT UNIT
52
CONTROL UNIT
16

FIG.14

CLASS	RGB RELATIONSHIP
0	R = G = B
1	B > R > G
2	R = B > G
3	R > B > G
4	R > G = B
5	R > G > B
6	R = G > B
7	G > R > B
8	G > R = B
9	G > B > R
10	G = B > R
11	B > G > R
12	B > R = G

FIG.15

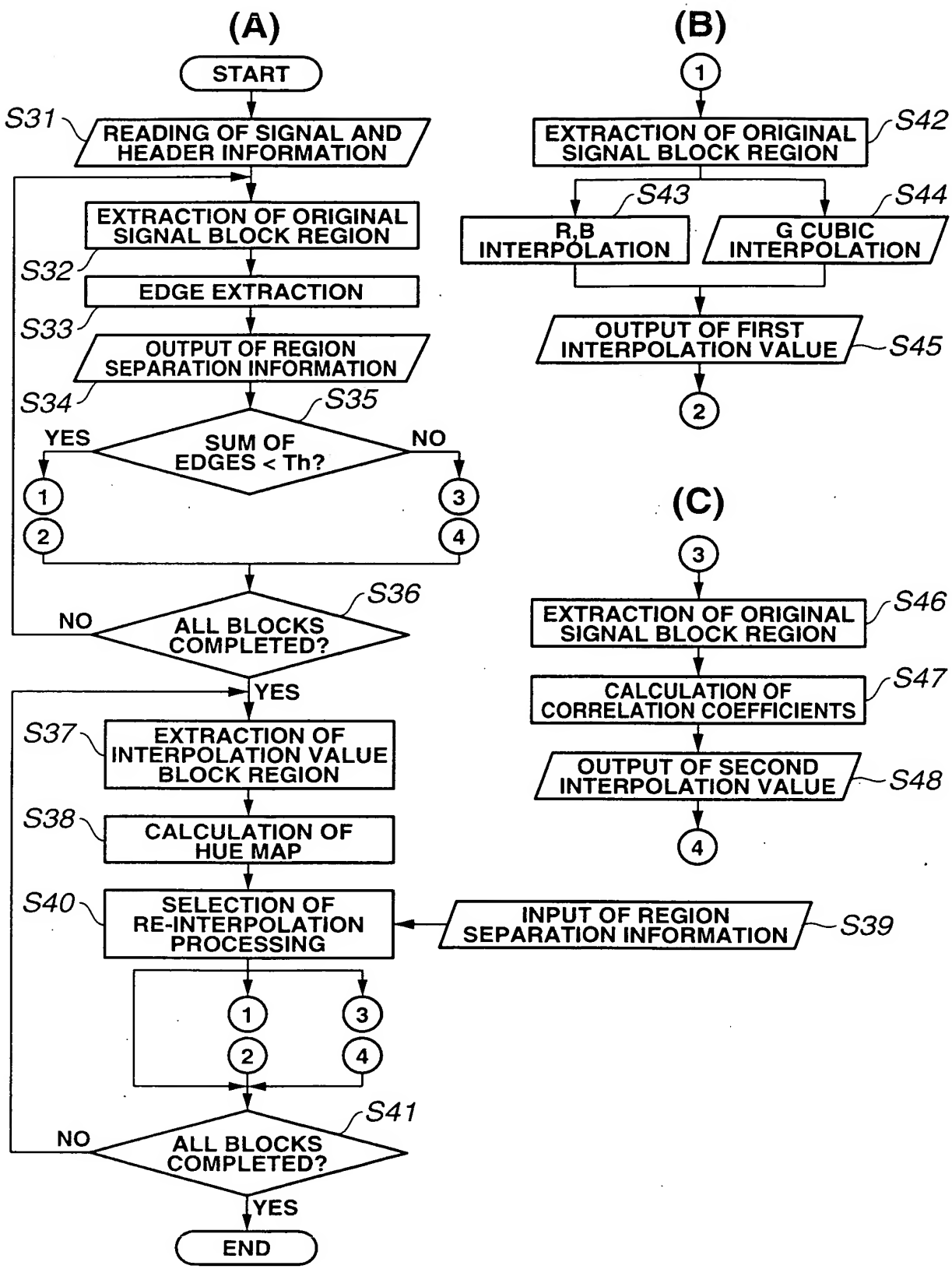

(A)
START
S31
READING OF SIGNAL AND HEADER INFORMATION
EXTRACTION OF ORIGINAL SIGNAL BLOCK REGION
S32
EDGE EXTRACTION
S33
OUTPUT OF REGION SEPARATION INFORMATION
S34
S35
SUM OF EDGES < Th?
YES
NO
1
2
3
4
S36
NO
ALL BLOCKS COMPLETED?
YES
S37
EXTRACTION OF INTERPOLATION VALUE BLOCK REGION
S38
CALCULATION OF HUE MAP
S40
SELECTION OF RE-INTERPOLATION PROCESSING
S39
INPUT OF REGION SEPARATION INFORMATION
S41
NO
ALL BLOCKS COMPLETED?
YES
END
(B)
1
EXTRACTION OF ORIGINAL SIGNAL BLOCK REGION
S42
S43
R,B INTERPOLATION
S44
G CUBIC INTERPOLATION
OUTPUT OF FIRST INTERPOLATION VALUE
S45
2
(C)
3
EXTRACTION OF ORIGINAL SIGNAL BLOCK REGION
S46
CALCULATION OF CORRELATION COEFFICIENTS
S47
OUTPUT OF SECOND INTERPOLATION VALUE
S48
4

FIG.16

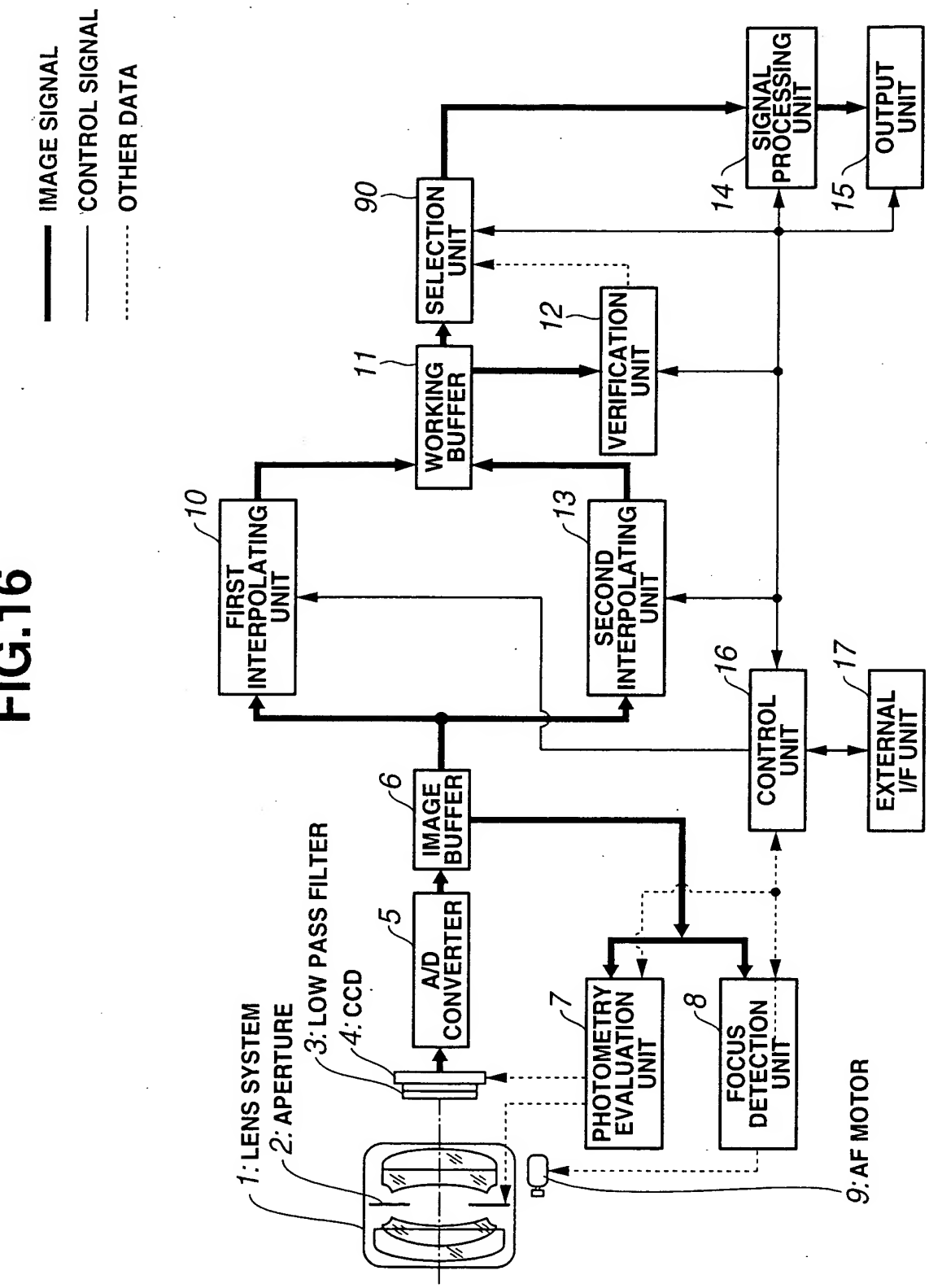


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
1: LENS SYSTEM
2: APERTURE
3: LOW PASS FILTER
4: CCD
5
A/D CONVERTER
6
IMAGE BUFFER
7
PHOTOMETRY EVALUATION UNIT
8
FOCUS DETECTION UNIT
9: AF MOTOR
10
FIRST INTERPOLATING UNIT
11
WORKING BUFFER
12
VERIFICATION UNIT
13
SECOND INTERPOLATING UNIT
14
SIGNAL PROCESSING UNIT
15
OUTPUT UNIT
16
CONTROL UNIT
17
EXTERNAL I/F UNIT
90
SELECTION UNIT

FIG.17

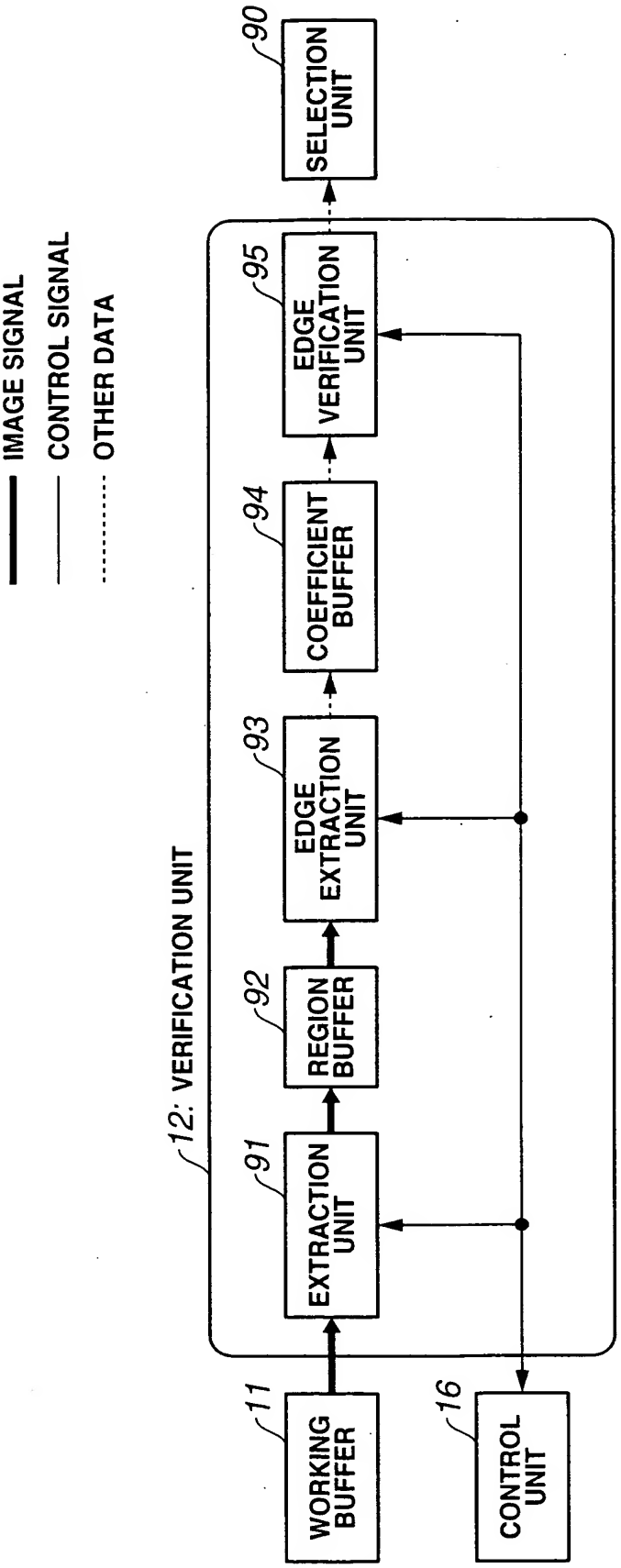
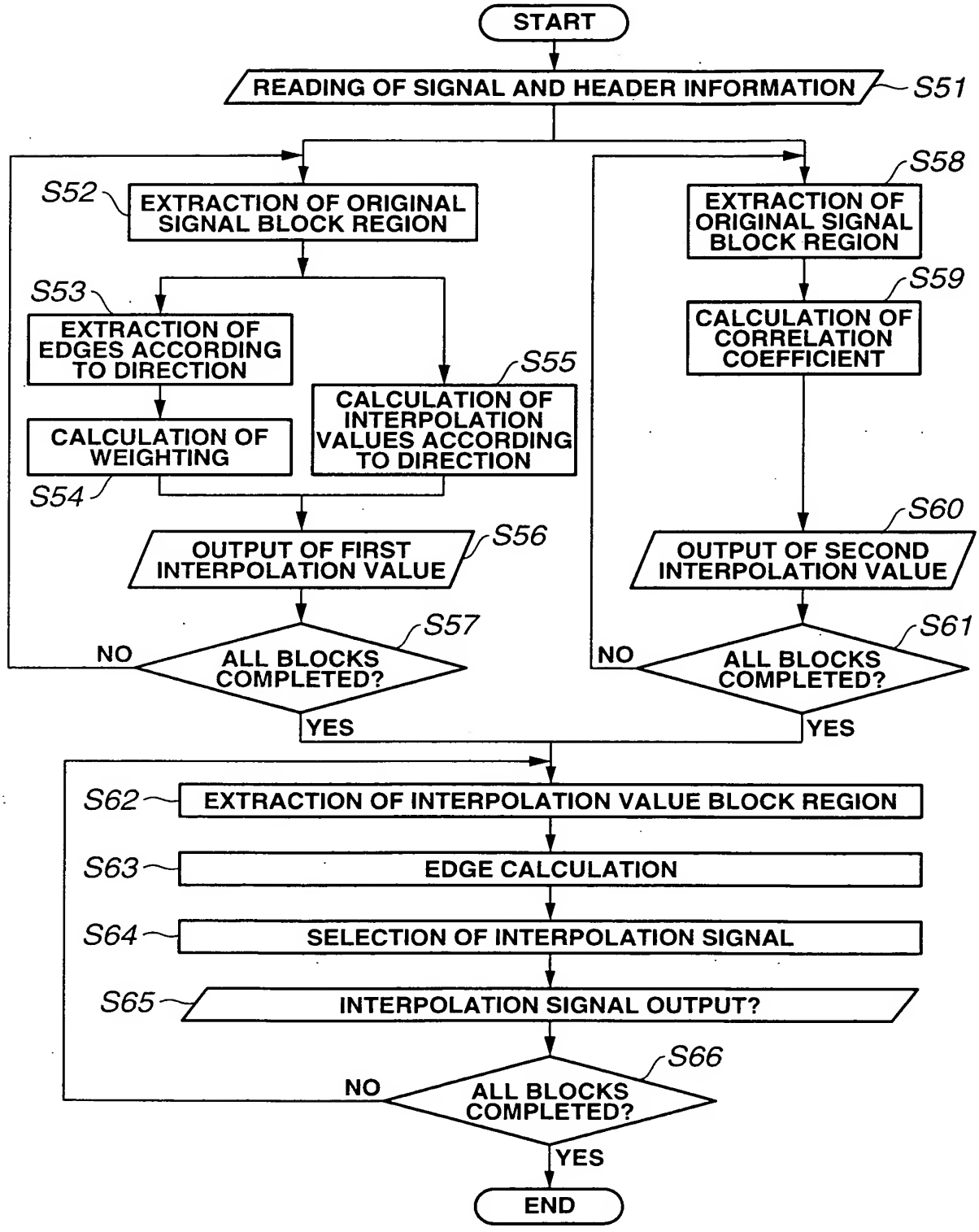


IMAGE SIGNAL
CONTROL SIGNAL
OTHER DATA
12: VERIFICATION UNIT
11
WORKING BUFFER
91
EXTRACTION UNIT
92
REGION BUFFER
93
EDGE EXTRACTION UNIT
94
COEFFICIENT BUFFER
95
EDGE VERIFICATION UNIT
90
SELECTION UNIT
16
CONTROL UNIT

FIG.18


START
READING OF SIGNAL AND HEADER INFORMATION
S51
S52
EXTRACTION OF ORIGINAL SIGNAL BLOCK REGION
S53
EXTRACTION OF EDGES ACCORDING TO DIRECTION
CALCULATION OF WEIGHTING
S54
S55
CALCULATION OF INTERPOLATION VALUES ACCORDING TO DIRECTION
OUTPUT OF FIRST INTERPOLATION VALUE
S56
S57
NO
ALL BLOCKS COMPLETED?
YES
S58
EXTRACTION OF ORIGINAL SIGNAL BLOCK REGION
S59
CALCULATION OF CORRELATION COEFFICIENT
S60
OUTPUT OF SECOND INTERPOLATION VALUE
S61
NO
ALL BLOCKS COMPLETED?
YES
S62
EXTRACTION OF INTERPOLATION VALUE BLOCK REGION
S63
EDGE CALCULATION
S64
SELECTION OF INTERPOLATION SIGNAL
S65
INTERPOLATION SIGNAL OUTPUT?
S66
NO
ALL BLOCKS COMPLETED?
YES
END